CASE No. 12

REQUEST FOR RECONSIDERATION OF CATEGORIES OF TYPES OF SPECIES AND SUBSPECIES RECOGNIZED BY THE INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE. Z.N.(S.) 1512

By Hobart M. Smith (*Department of Zoology, University of Illinois, Urbana, Illinois, U.S.A.*)

Many systematists continue to use the designation " paratype " for specimens of the type hypodigm of a species or subspecies, despite the strong arguments against such designation advanced by respected and influential authorities such as Simpson (1940), Williams (1940), and Mayr, Linsley and Usinger (1953 : 240). Defenders of the practice have proposed varied excuses for its retention (*e.g.* Newell, 1949), but their arguments have seemed relatively ineffective in the face of continued pressure for abandonment of it (*e.g.* Simpson, 1961 : 47, 186).

The arguments for excluding " paratypes " from official recognition (*i.e.*, by the International Commission on Zoological Nomenclature) have been based largely upon the view, with which I wholly agree, that the role in taxonomy of types of any sort must be strictly onomatophorical (name-bearing) for any given population. Perhaps part of the zeal focused upon elimination of the " paratype practice " may stem in part from the clearly unwarranted role the practice has played in the past in typological concepts of taxonomy, and perhaps this role or even baser ones has lurked behind the defences erected for the practice. However, equally repugnant roles have been held by the term " type ", which still receives official as well as authoritative acceptance. Nevertheless, Simpson correctly points out (1961 : 48) that " the dead hand of the past " outweighs the influence of reason in any proposal to replace the irrational term " type " with some rational terms such as " onomatophore ".

In like manner I see no prospect of replacement of the term " paratype " in its onomatophorical role ; in fact there is little reason to do so with retention of the term " type ". The question basically is, and has been, the exact onomatophorical role, if any, that could justify retention of the paratype concept, granting that retention is justified *only* if such a role is subserved. In my opinion paratypes do perform an important service in exactly that role—one which has not received adequate attention. An orderly presentation involves the following terms, all of which I here propose the International Commission on Zoological Nomenclature accept ; those indicated by an asterisk (*) have already been accepted by the Commission.

1. **Syntype*—one of two or more specimens of the type hypodigm in which no holotype is originally designated.

2. **Holotype*—the single specimen in a type hypodigm consisting of but one example, or, if more than one specimen is at hand, which is designated specifically as " the " type or holotype.

(a) Lectoholotype—a syntype (or paratype) specifically selected subsequently (*i.e., after the original description appears*) as " the " type, lectotype, lectoholotype or holotype. It must be a member of the syntype or paratype series.

(b) Autoholotype—a single member of the original hypodigm selected originally (*i.e., in the original description*) as " the " type or holotype.

3. *Paratype*—any member of the original hypodigm involving an autoholotype, if none is specifically designated as paratype, or any member specifically so designated if paratypes *are* designated in the original hypodigm that involves an autoholotype.

(a) Lectoparatype—any syntype, other than the lectoholotype, so designated automatically with selection of a lectoholotype : therefore, a paratype created *subsequently*, from the original hypodigm.

(b) Autoparatype—any paratype created *originally*.

4. *Hypoparatype*—any member of the original hypodigm specifically designated as a hypoparatype, or, if paratypes are designated, that is not designated as a paratype or holotype.

(a) *Lectohypoparatype*—any member of the original hypodigm, syntype or paratype, *subsequently* designated as a hypoparatype or lectohypoparatype, or which is designated as unfit for onomatophorical purposes.

(b) *Autohypoparatype*—a hypoparatype *originally* created.

*5. *Neotype*—a subsequently-designated onomatophore *not chosen* from the onomatophorically available original hypodigm (hypoparatypes not being onomatophorically available), therefore not from among the syntype or paratype series.

*6. *Type*—unless otherwise stated or revealed by context, the holotype.

*7. *Lectotype*—unless otherwise stated or revealed by context, the lectoholotype.

Discussion

For taxonomic work not dependent upon previous work, the terms holotype, paratype and hypoparatype are adequate ; the terms lectotype and type are synonyms of other words and do not merit use except in reallocation of antiquated usages to more exact, modern expressions ; and the other terms are essential in taxonomic work which does involve previous studies.

The system of type terminology here proposed is simply a hierarchy of potential substitutes for a single, functional name-bearer. The concepts involved in it are completely harmonious with modern views and practices. Not in every instance is utilization of the finer subdivisions, as indicated by the prefixes, necessary or desirable, but certainly the concepts represented by the terms are essential in modern taxonomy, and in discussions of taxonomy terms for those concepts play an extremely useful role in providing for (1) clarity of thought, (2) brevity of expression and (3) crystallization of perspective.

The roots of the proposed system lie in the long-accepted equivalence of syntypes in exactly this role of provision of a *single* name-bearer for a taxon. In the modern realization that taxonomic types can serve one role as name-bearer, and that role only, the acceptance in current work of the now antiquated

designation of a *series* of specimens—the syntypes—in the name-bearing role has been impossible. The " lectotype " concept has evolved in solution to this dilemma, with the selected lectotype serving as the name-bearer and the rest of the syntypes held in reserve to serve as lectotype II, lectotype III and so on, should the designated name-bearers become lost, destroyed or deteriorated beyond reasonable utility.

With acceptance of the lectotype concept the need in new taxonomic work for an originally-designated name-bearer became obvious, with the result that designation of a specific type specimen—*i.e.*, a specimen from the original type series or hypodigm under the name of holotype became common and accepted practice. The term " type " for this specifically-designated specimen was and remains of questionable merit since it fails to make clear that this specimen is a double designate—not only of the original hypodigm, but the specifically-designated name-bearer selected from that hypodigm.

For various reasons, none usually defendable, the practice of hallowing the rest of the original hypodigm, over and above the holotype, became common as the holotype concept grew in acceptance. After all, the entire original hypodigm *was* held in esteem in older taxonomic practice, and no sudden reversal, even with elevation in importance of one member of the hypodigm as the holotype, could be expected. The natural recourse was to designation of non-holotypic members of the original hypodigm as some other kind of type ; the convention of greatest popularity was designation of these " accessory " types as paratypes. The logical parallel with the lectotype-syntype situation is evident. The one thing that was not evident, or at least not widely so, was that the sole justification for the designation and existence of paratypes was for them to serve exactly the same role as the syntypes that remained after designation of a lectotype : as potential, substitute name-bearers, and as nothing else. Regardless of the original grounds for recognition of paratypes, I regard them as wholly justifiable on substitute grounds. Lacking such a mandatory tie to the original hypodigm, a totally acceptable sequel to loss, destruction or deterioration beyond reasonable utility of a holotype would be the substitute for it of a neotype not forming part of the original hypodigm, in deliberate disregard of the original hypodigm or because of difficulty in locating the components of the original hypodigm ; that such a practice should be regarded as ethically responsible and in the best interests of nomenclatural stability is inconceivable. Paratypes have exactly the same claim to recognition as non-lectoholotypic syntypes ; both are barriers to nomenclatural chaos.

With admission of acceptability of the paratype concept, however, the lectotype-syntype designations quite evidently leave something to be desired. A lectotype is in reality a lectoholotype, being a specific example of the syntype (or paratype) series selected to act as name-bearer ; the parallelism of lectotype and holotype is more exactly expressed by the renditions lectoholotype and autoholotype respectively—one " elected " subsequently, the other designated originally.

With admission of the holotype concept to the syntype situation, in the form of the lectoholotype, the remaining syntypes, in emphasis upon their role parallel to that of paratypes, are in reality lectoparatypes ; originally

designated paratypes are autoparatypes. The distinction need not necessarily be recognized officially, but a definite advantage exists in such recognition through the emphasis it lends to the parallel role autoparatypes and lectoparatypes must serve in taxonomy. Named or not, the concepts exist and are valid ; acceptance of terms for them assure to a certain degree that the concepts will not be overlooked.

It is also evident that some examples of the original hypodigm frequently are quite inadequate to serve in a reasonably useful way as name-bearer, should circumstances ever reduce the consideration for selection of a substitute name-bearer to specimens not specifically designated as paratypes. Failure to designate certain specimens of the original hypodigm as paratypes, even though others are so designated, might be taken as implying that these are not to be recommended for use as substitute name-bearers. An explicit approach to the same end is outright indication of deficiency for a name-bearing role, through designation as hypoparatypes. The entire original hypodigm can thus be identified without attendant risk that marginally useful specimens would ever serve as name-bearers. Official admission of this term and concept would be highly useful.

Admission that some parts of the original hypodigm in new taxonomic work are not suitable as substitute name-bearers certainly finds its equivalent in old taxonomic work involving syntypes. Furthermore, specimens now perfectly acceptable as substitute name-bearers, either lectoparatypes or autoparatypes, may in the future become too damaged or deteriorated to serve reasonably effectively as name-bearers. It is therefore useful to admit the concept of lectohypoparatypes for specimens subsequently designated as unfit to serve as name-bearers, as opposed to autohypoparatypes for specimens originally designated as unfit. No obligation should exist to select an onomatophore from either sort of hypoparatype ; on the contrary such material should be avoided in onomatophore selection if at all possible. Classification by any author, originally or subsequently, of any paratypes or lectoparatypes as hypoparatypes (autohypoparatypes or lectohypoparatypes) should be admitted as officially removing those specimens from consideration as substitute name-bearers.

The International Code has, unfortunately, not been explicit in stating exactly to what degree substitute onomatophores *must be drawn* from the original type material, or to what degree original type material *may be excluded* from the requirement that they serve as potential substitute name-bearers. Decision on these points, or at least expression of recommendation, is a prerequisite to crystallization of these concepts and the terms that represent them. For example, the existing Code prescribes that lectotypes (lectoholotypes) can be designated only from syntypes ; therefore if an autoholotype is destroyed the substitute onomatophore would be a neotype, which in turn is to be designated only if no " holotype, lectotype or syntype " exists. Obviously if lectoholotypes must be selected from the syntype series in succession as they are lost or destroyed (as long as the syntype series remains in existence), logically *lectotypes*—not neotypes—selected from paratype series should replace lost or destroyed autoholotypes.

Furthermore, it should be explicit that the transformation of non-lectoholotypic syntypes to lectoparatypes leaves them still syntypes and therefore available for subsequent designation as lectoholotype II, III *et seq.* as losses demand.

Finally, the concept of inadequacy of some parts of a hypodigm ever to serve as name-bearers deserves official recognition, and with it the right of taxonomists to so designate any parts of their own or others' type hypodigms. This device then allows the taxonomist the liberty of designating a neotype even when some material of the original hypodigm is in existence. It might also be well to recognize officially that when, in revisionary work, even holotypes (either lecto- or auto-) are encountered that are inadequate for name-fixation, the taxonomist should have the right to reject such types and to substitute for them a neotype or lectoholotype in accordance with the conditions of the situation.

Summary

It is proposed that official recognition, and sanction of represented concepts and definitions as here set forth, be given by the International Commission on Zoological Nomenclature to the terms onomatophore, hypodigm, holotype, lectoholotype, autoholotype, paratype, lectoparatype, autoparatype, hypoparatype, lectohypoparatype, and autohypoparatype. It is suggested that designation of neotype or lectoholotypes be permitted in explicit substitution for existing onomatophores whose condition precludes reasonably secure allocation to known taxa.

Literature Cited

Mayr, E., Linsley, E. E., and Usinger, R. L. 1953. Methods and principles of systematic zoology. McGraw-Hill, New York

Newell, N. D. 1949. Types and hypodigms. *Amer. Journ. Sci.* **247** : 134–142

Simpson, G. G. 1940. Types in modern taxonomy. *Amer. Journ. Sci.* **238** : 413–431

——. 1961. Principles of animal taxonomy. Columbia Univ. Press, New York

Williams, C. B. 1940. On " type " specimens. *Ann. Ent. Soc. Amer* **33** : 621–624